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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------|-------------|----------------------|---------------------|------------------|
| 09/787,793 | 06/12/2001 | Atsushi Yatagai | 1752-0143P | 9670 |
| 2292 | 7590 | 12/28/2004 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH | | | NAFF, DAVID M | |
| PO BOX 747 | | | | |
| FALLS CHURCH, VA 22040-0747 | | | ART UNIT | PAPER NUMBER |
| | | | 1651 | |

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/787,793 | YATAGAI ET AL. | |
| | Examiner | Art Unit | |
| | David M. Naff | 1651 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 06 October 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 21-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 21-28 and 31-34 is/are rejected.
- 7) Claim(s) 29 and 30 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

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DETAILED ACTION

An amendment of 10/6/04 canceled claims 1-9 and 15-20 (10-14 previously canceled), and added new claims 21-34.

Claims examined on the merits are 21-34, which are all claims in the application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

Claims 21-24 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lennemann (4,428,700).

The claims are drawn to a denitrifying composition containing particles of calcium carbonate dispersed in sulfur by heating and dispersing calcium carbonate particles in melted sulfur and solidifying the dispersion by cooling, wherein a microporous substance is additionally dispersed in the sulfur, and the ratio by weight of sulfur to calcium carbonate is 1:0.3 to 1:3.

Lennemann disclose (paragraph bridging cols 2 and 3) preparing sulfur cement by adding an aggregate that can be limestone to molten sulfur (col 3, line 1), and cooling to solidify (col 3, line 9). The amount of aggregate can be about 50-86% by weight (col 4, line 64). In addition to the aggregate, up to 15% by weight of an inert additive such as silica flour, mica, glass, or metallic or mineral fibers or frits or mixtures thereof (col 2, lines 54-56).

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The claimed composition can be the same as the sulfur cement containing limestone and inert additive disclosed by Lennemann since the claimed procedure for preparing the composition is the same as disclosed by Lennemann for preparing sulfur cement. The weight ratio range of claim 21 and the parts by weight of claim 22 encompasses amounts of calcium carbonate in the range of 50-86% of aggregate disclosed by Lennemann. The inert additive such as silica powder disclosed by Lennemann is a microporous substance as claimed, and the parts by weight of claim 22 are less than 15% as disclosed by Lennemann. The sulfur used by Lennemann appears to be amorphous as in claim 23. If not amorphous, it would have been obvious to use this form since this is a readily available commercial form of sulfur. The sulfur cement of Lennemann is in a shape as required by claim 24.

Response to Arguments

Applicants urge that Lennemann discloses the use of sulfur cement for solidifying radioactive waste. However, the sulfur cement of Lennemann can be prepared as a solid in powder, flake, granular or palletized form prior to use for solidifying waste (col 3, lines 8-11). Prior to use, the cement is the same as the presently claimed composition. The present claims are not drawn to a method of use, but are claiming a composition. The composition of the present claims encompasses a sulfur cement as disclosed by Lennemann.

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Claim Rejections - 35 USC § 103

Claims 21, 23-26 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overath et al (DE 3414556) in view of Kruithof et al or van der Hoek et al.

The claims are drawn to a composition as set forth above and to methods of using the composition for decreasing nitrate nitrogen in water or an effluent.

Overath et al disclose removing nitrate from water using a sulfur impregnated porous support which can be activated carbon (page 6, line 2 of translation). The amount of sulfur can be 5-95 wt% (page 6, line 10). The support material can be impregnated with sulfur by mixing sulfur with the support material and heating to 120-3,000°C for 1-40 hours (page 7, lines 3-5 of the translation).

Kruithof et al and van der Hoek et al disclose nitrate removal from water using a sulfur/limestone combination. The limestone maintains an optimal pH and provides inorganic carbon for bacteria. See Kruithof et al (page 208, last sentence of 5th paragraph) and van der Hoek et al (sentence bridging the cols on page 197).

It would have been obvious to add limestone to the sulfur impregnated in a porous support as disclosed by Overath et al to obtain the function of the limestone to control pH and provide carbon for bacteria as disclosed by Kruithof et al or van der Hoek et al. It would have been further obvious to mix the limestone with molten sulfur and cool to obtain a solid since Overath et al disclose heating to a temperature of 120-3,000°C that will make the sulfur molten after

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mixing with the support. The amount of sulfur and limestone disclosed by Kruithof et al or van der Hoek et al would have suggested an amount in the range of the claimed ratio of sulfur to calcium carbonate. The methods of decreasing nitrate nitrogen as in claims 31-34 would have been obvious from the methods disclosed by Overath et al and Kruithof et al or van der Hoek et al for removing nitrate. Obtaining the carbon of Overath et al from rice hull as in claim 25 would have been obvious to obtain the carbon from an inexpensive rice hull byproduct of rice processing. Using kieselguhr as the porous material of Overath et al as in claim 26 would have been obvious since kieselguhr is a well known porous material.

Response to Arguments

It is granted as urged by applicants that each reference does not disclose all aspects of the claimed invention. However, the references are combined together, and the invention becomes obvious when the references are considered together as a whole, and not each alone. Kruithof et al and van der Hoek et al clearly teach calcium carbonate, and its beneficial function that would make its use in the sulfur of Overath et al obvious. Overath et al disclose conditions that will produce melted sulfur and the use of substances that are microporous. There is seen no difference in Overath et al from Kruithof et al and van der Hoek et al that will make adding limestone to the molten sulfur of Overath et al for its expected function unobvious.

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Claim Rejections - 35 USC § 103

Claim 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 21, 23-26 and 31-34 above, and further in view of Heinzel (DE 19807406).

5 The claims require the microporous substance of the composition of claim 21 to be a cation exchanger.

Heinzel discloses using zeolite as a support for microorganisms when treating waste water. The zeolite additionally has an advantage of selectively exchanging ammonium ions and adsorbing organic molecules (page 4, second full paragraph of translation).

When adding limestone to the sulfur of Overath et al as set forth above, it would have been obvious to add zeolite to obtain its function to selectively exchange ammonium ions and adsorb organic molecules as disclosed by Heinzel and to obtain its function as the porous material of Overath et al. Zeolite has cation exchange capacity.

Response to Arguments

It is granted that Heinzel is not using sulfur and calcium carbonate and carrying out denitrification as urged by applicants. However, these differences would not make unobvious to use zeolite for its function as disclosed by Heinzel in combination with sulfur and limestone for the denitrification of Overath et al. Additionally, the zeolite would have been expected to function as a support as disclosed by Overath et al.

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Conclusion

Claims 29 and 30 are allowable, but are objected to as being dependent on a rejected claim.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

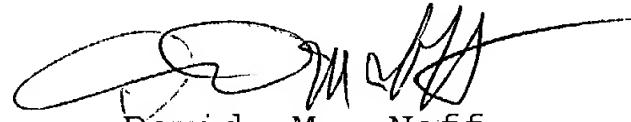
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for 5 unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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David M. Naff
Primary Examiner
Art Unit 1651

DMN
12/23/04